the Wechsler

VOL. 11 APRIL 1952 NO. 5

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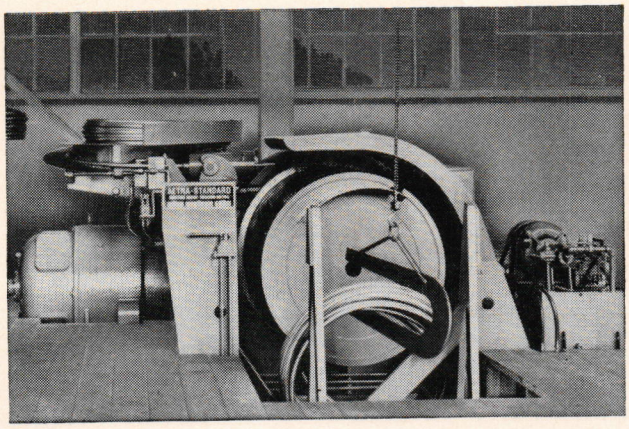
THE SCHOOL OF ENGINEERING
GEORGE WASHINGTON UNIVERSITY

Another page for **YOUR BEARING NOTEBOOK**



How TIMKEN® bearings help a drum stay fit as a fiddle

This horizontal bull block draws tubing at 150 to 600 feet per minute. The overhung drum on which the tubing is coiled exerts a 20,000 pound pull. To carry this heavy load, design engineers mount the drum shaft on Timken® tapered roller bearings. Due to line contact between rollers and races, Timken bearings provide extra load-carrying capacity. Their tapered construction enables them to carry radial and thrust loads in any combination. Shafts are held in rigid alignment. Wear is reduced, long life assured.

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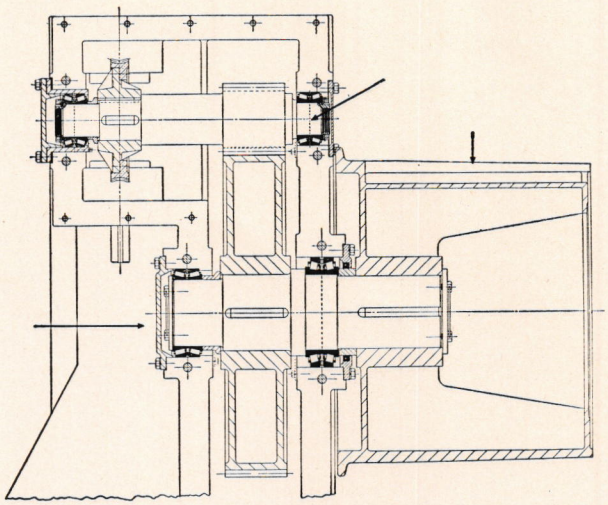
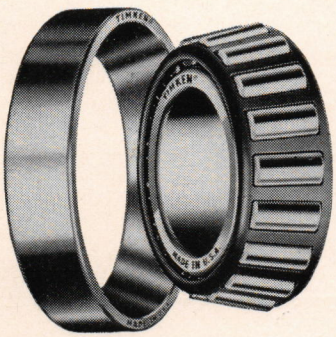
Power input shaft and drum shaft of the horizontal bull block are mounted on two-row, non-adjustable Timken bearings. The left-hand bearing on each shaft is fixed while the bearing on the opposite end of the shaft is free to float. The fixed bearing cup in the power input shaft is mounted in a cartridge to provide an adjustment for the worm wheel. Lubricant is carried to the bearings by means of a circulating oil system.





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TRADE-MARK REG. U. S. PAT. OFF.

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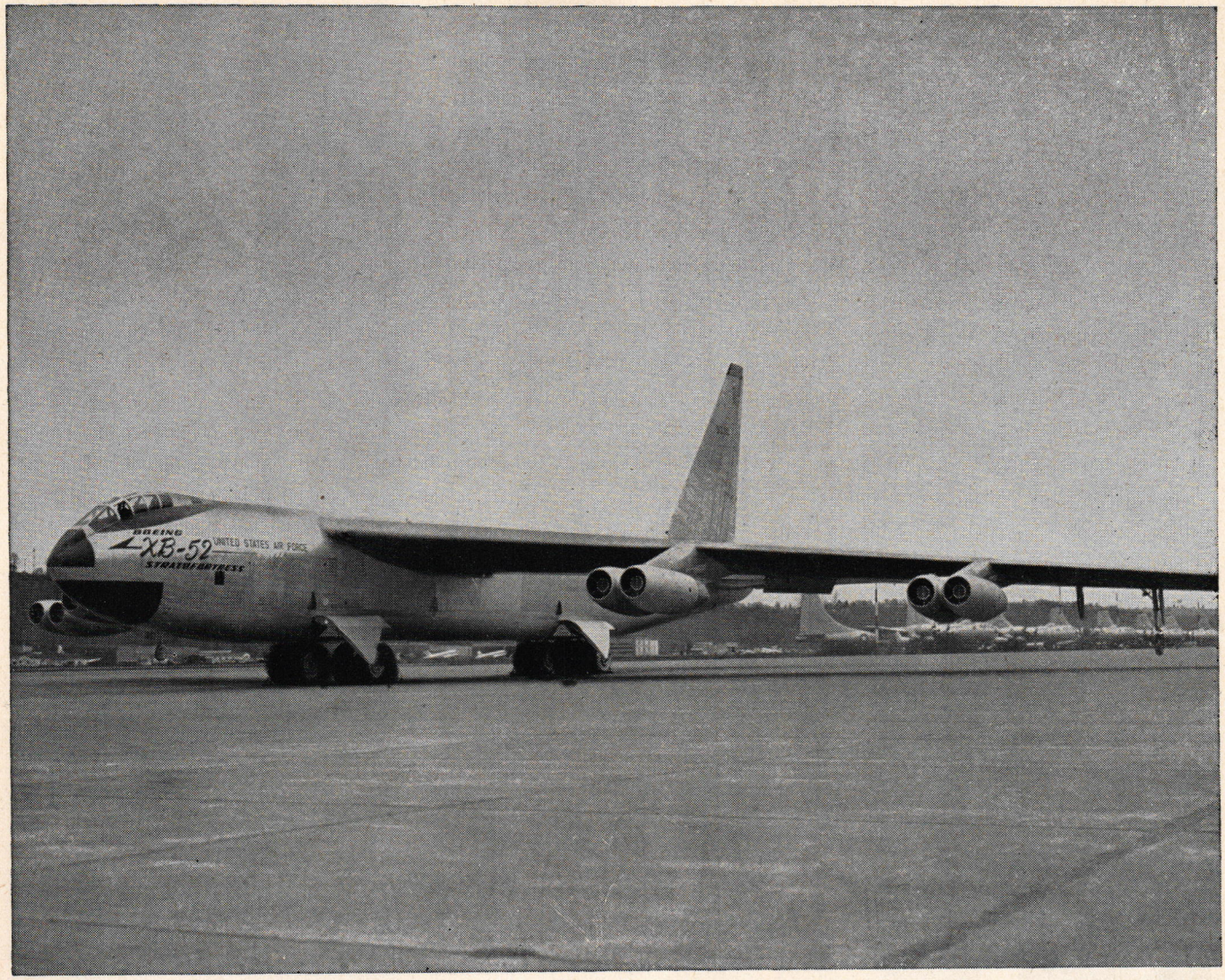
NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION ✳



Engineering secrets are under her skin

This is the first official photo of the giant Boeing eight-jet XB-52. It's America's new all-jet heavy bomber, and another trail-blazing product of Boeing engineering leadership. Still highly classified, Boeing's most revolutionary developments are out of sight, under the XB-52's gleaming skin.

The B-52, vital to America's defense plans, is just one of the challenging projects Boeing engineers are at work on. Others include guided missiles, supersonic research, and the B-52's team-mate, the six-jet B-47 medium bomber, now in quantity production.

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You can work either in Seattle, heart of the Pacific Northwest, or in progressive Wichita, Kansas. Boeing provides a generous moving and travel allowance, gives you the benefit of special training programs, and pays a good salary that grows with you.

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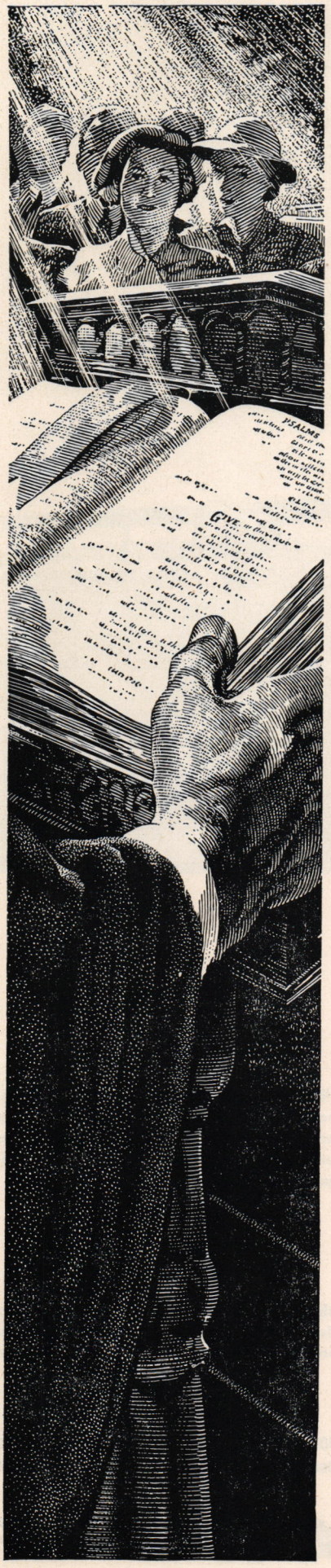

"No mud on *our* Pulpit!

"No . . . not in our *little church!*

"But something the Pastor said reminded me of a service I'll never forget. Later, Helen told me I'd said *'Mud!'* out loud. That's why she dug me in the ribs and said *'John, wake up!'*

"I guess I *was* wool-gathering. I was back overseas, listening to a Chaplain who'd found a spot of beauty in a grove of trees for his services . . . right smack in the middle of a war! The green branches made a church-like arch. The sun filtered through the branches like through our church windows.

"The Chaplain's pulpit? Just the hood of a homely Army Jeep . . . *splattered with mud.* No organ music . . . just the booming of big guns far off. No pews, either . . . just mud to sit in. But I felt just as close to God then as I did last Sunday in our Maple Street Church.

"After Helen nudged me awake, I thought of countries where mud *is* slung at pulpits. Where men of the cloth are jailed. Where churches are closed or burned. And where God is disowned. I gave thanks that *here* we respect *all* churches.

"Freedom of worship is *one* of our precious rights. Other Freedoms include our right to vote as we please . . . and without anyone knowing *whom* we vote for. To get rip-roaring mad when we see our taxes wasted by wild spending . . . and when we read about charges of corruption against public officials. To choose our own jobs, like I did when I applied for one at Republic. To own our own homes. To drive our own car across state lines with nobody to push a gate down in our faces.

"I said an *extra* prayer last Sunday: *May our Reverend Johnsons, Father Kellys and Rabbi Cohens always have that sacred Freedom to preach their gospel from unmuddied pulpits. Amen."*

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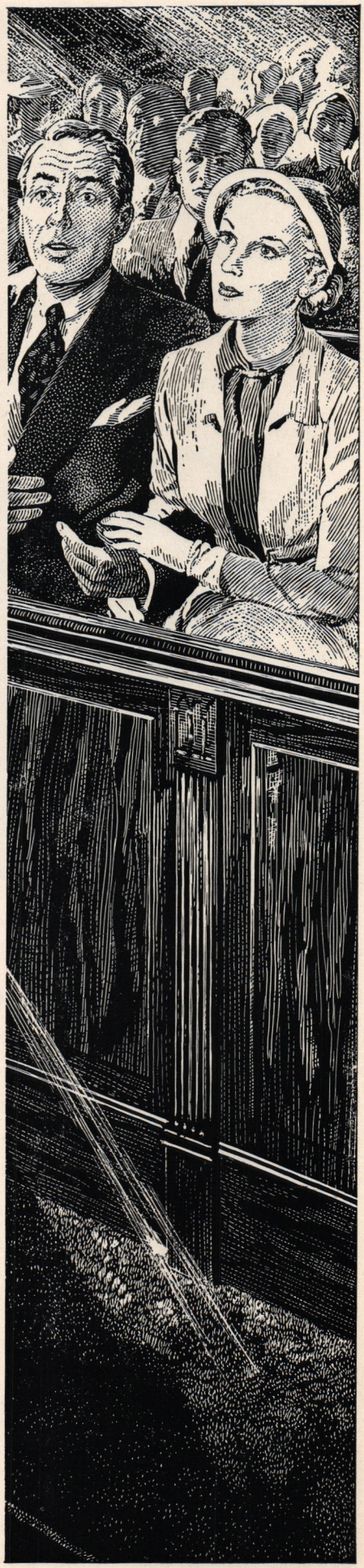
Republic Building • Cleveland 1, Ohio

REPUBLIC STEEL

Republic BECAME strong in a strong and free America. Republic can REMAIN strong only in an America that remains strong and free . . . an America whose aircraft streak to all corners of the free world on missions of commerce, mercy and peace. *Through the Aircraft Industry, too, Republic serves America.* Republic furnaces and mills produce aircraft-quality steels . . . steels for the tools to shape the parts . . . steels for the instruments that guide the way . . . for sheltering hangars . . . for the reinforcing that makes safer runways. Republic is proud of the part it plays in supplying so much of the *ground-based* production power that keeps America powerful *aloft.*

* * *

For a full color reprint of this advertisement, write Dept. H, Republic Steel, Cleveland 1, Ohio.



the Mecheleciv

VOL. 11 APRIL 1952 NO. 5

ON THE COVER . . .

The fastest known bomber in the world, the B-47 Stratojet is a six jet-engine powered swept wing bomber built for the Air Force by the Boeing Airplane Company at Wichita, Kansas. The Air Force describes this plane as a medium bomber in the 600 mph speed class.

The Stratojet made a record-breaking transcontinental speed dash on February 8, 1949 - flying 2289 miles from Larson AFB, Washington State to Andrews Field, Maryland in 3 hrs. and 46 minutes. The average speed was 607.8 mph.

Powered with GE J-47 engines developing 5,200 pounds of thrust each, gives this 92½-ton bomber a total thrust of 31,200 pounds.

—PHOTO BY BOEING

FRONTISPIECE . . .

The United Nations Building in New York juts imposingly into the sky, framed by the lattice-work of the steel skeleton of the double-deck East River Drive. Four of the 39 stories of this 512 foot cantilever of glass, steel and stone is dedicated to utility space only. This unique planning of floor, circulation and utility spaces makes this one of the most interesting buildings in the world, engineering-wise.

CUT COURTESY OF THE FAIRCHILD AIRPLANE AND ENGINE COMPANY'S MAGAZINE "PEGASUS".

ENGINEERING SCHOOL CALENDAR

APRIL

2—*Engineering Societies*, Government Building, 8:15

9—*Theta Tau*, Monroe Hall, Room 203, 8:15

11—*Engineers' Council*, Special Meeting—Conference Room, 8:15

19—*Sigma Tau Initiation*, Lisner Auditorium, Studios A and B, 2:00

Sigma Tau Initiation Banquet—Hamilton Hotel, 6:30

ASCE Regional Conference, Monroe Hall. Morning Session, 10:30, Speaker: General G. E. Edgerton. Evening Session, Banquet, Carlisle Hotel, 6:30, Speaker: Rear Admiral J. F. Jelley

23—*Engineers' Council*, Conference room, Building M, 8:15

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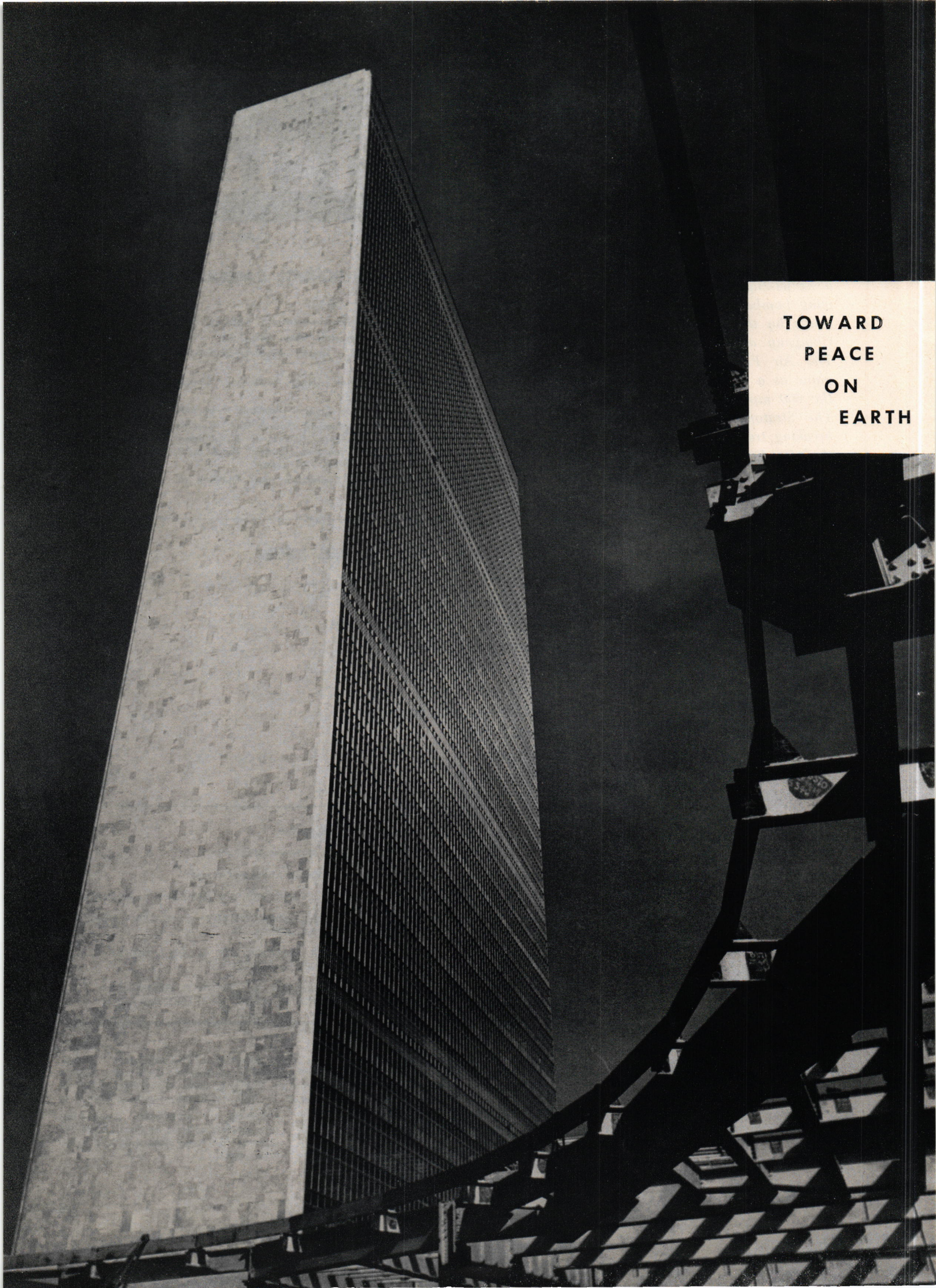

TOWARD
PEACE
ON
EARTH

Prexy . . .

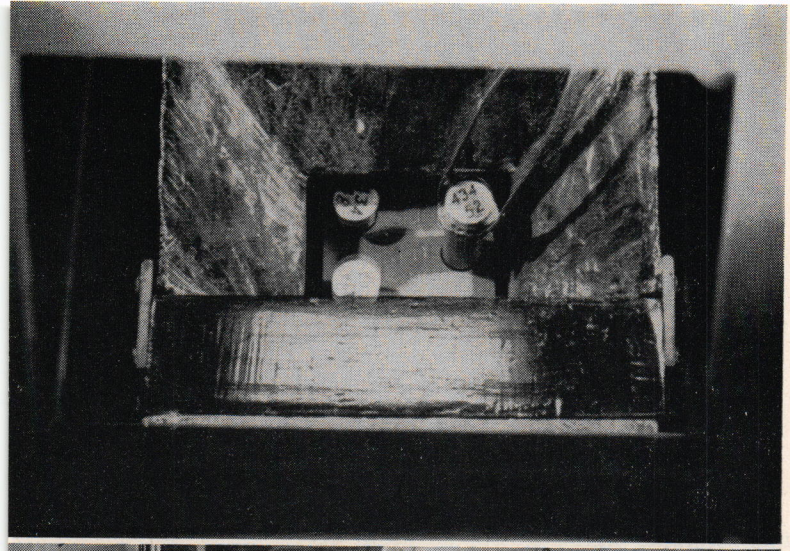
It is not surprising to see a dignified, familiar figure slowly wending his way among the various buildings of the university, particularly those under construction. An engineer at heart, Dr. Marvin enjoys being in proximity with things being built and experiencing that exhilarating feeling that comes from watching structures that began as an idea conceived in the minds of man being born before his eyes, each intimate secret of its progressive development revealed only to he who understands.

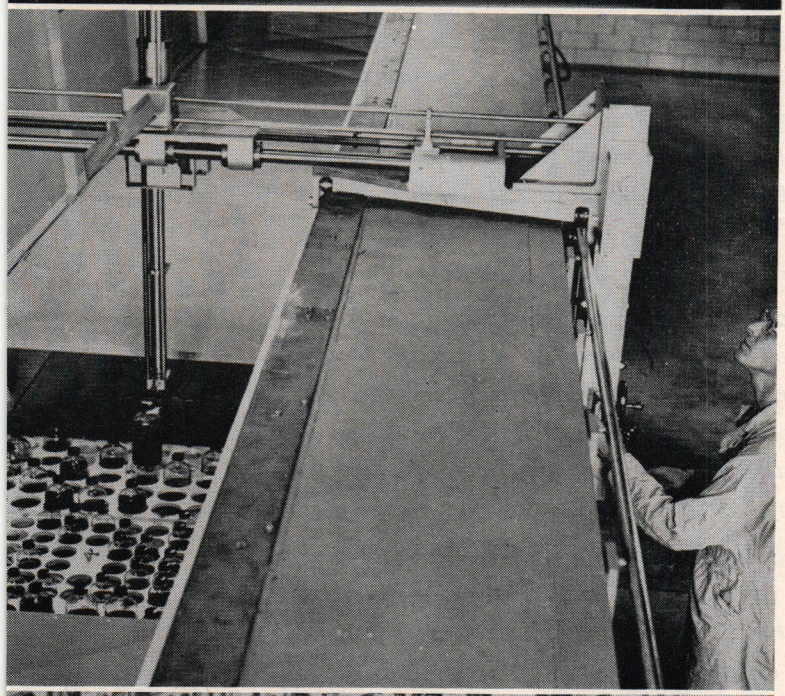
Dr. Marvin has brought himself closer to the School of Engineering than ever before and is supporting many of its ideas while exhibiting a keen interest in the extra-curricular affairs of its student body. It may be that, since he has constantly been in the middle of the planning of the new engineering buildings and because he takes pride in being able to talk and think like an engineer, he has unwittingly been drawn closer to that small, serious group that comprise the students and faculty of the School of Engineering.

He has been favorably impressed with the method of student government in the School of Engineering and the comradeship that prevails between faculty and student. He also understands the urgent need for a focal point of activities in this school and has stated on several occasions that he will give favorable consideration to providing a building to be used as headquarters for the Engineers' Council, engineering societies and fraternities, and the MECHELECIV when the opportunity presents itself; that is, when a suitable building becomes available. So far, he has been seriously handicapped by the fact that the majority of the university's old buildings have been condemned for public occupancy by the District of Columbia.

He adds, however, as he looks fondly at the renderings of the new Engineering School buildings, that ample facilities are going to be included in these buildings to assist in the professional and social development of the students outside of the classroom. From the time the ground is broken for this new building, we can be assured that our president will be a constant visitor at the construction site.

By Ewing Galloway NY





The atomic era--a

Ervin J. Liljegren, BSE '49
National Institute of Health

It is agreed that this title tells one nothing of what is to follow but it must be agreed that it affords an interesting euphony. The Atomic Era is a very broad subject and certainly can not be covered adequately in the space allotted to this paper. The engineer's part in this era limits the subject somewhat and it is intended to cover, briefly, some of the problems with which he will be confronted in the coming years. No attempt will be made to answer any of these problems although a few examples will be given to show how they are handled at the present time. This material is being presented in a provocative tone in the hope that some will feel sufficiently aroused to give these problems careful thought.

It is not impossible that we may see our future ships, trains and planes powered with atomic energy. It is almost certain that electric power will be so derived and possibly public heating will come from such a source. Although these are matters of conjecture at the present time, they are feasible and when available will require commercial and industrial development on a large scale.

The utilization of atomic energy will create new and infinite problems for the engineer. There will be problems of materials, construction, safety and many others as well.

Radioactive elements are by-products of atomic energy and are finding extensive use in medicine, biology and other fields of science at the present time. These radioactive materials, however, are considered potential hazards to all concerned. It will be necessary for an engineer to become familiar with these radioactive elements and their Alpha and Beta particles and Gamma rays so that he can be prepared to protect himself against their effects and provide adequate protection for others in his designs or work.

The creation of the Atomic Pile is considered one of the outstanding feats of modern engineering. The

¢ *Top* A view into the interior of the atomic pile at Oak Ridge, Tenn. —A.E.C. *Center* Preparation of an actual shipment of radioisotopes begins when an operator picks up an isotope storage bottle from one of the "boys" behind the storage barrier. The operator views operation through mirror above remote control tongs.—Oak Ridge National Laboratory. ***Bottom* Isotopes handled with the respect they are entitled to. Speed of handling and the distance one keeps away from the isotopes are the most important factors in protection against dangerous radiation.**—I.N.P.

challenge to the engineers' ingenuity

fact that relatively few have been injured from radiation while working with this pile speaks well for the safety engineering that was accomplished in connection with this project. However, the wide use of radioactive materials in many phases of science has greatly increased the safety problems, since these materials are generally used outside the confines of the pile. These problems are not confined to the specialized engineer who works only with these dangerous materials, but involve general construction engineers, sanitary engineers, industrial hygiene engineers as well as the more familiar electrical, mechanical and civil engineers. It is also a problem that requires cooperation from the physicist, the chemist and the doctor.

For example, we will consider a consulting engineer who has been assigned the responsibility of designing a laboratory which is to be used for experiments with radioactive materials. As he investigates the problem he will begin to realize that the standard ideas of construction are inadequate to meet the end results. Ordinary wall construction does not, for instance, provide the necessary protection for personnel. The reason for this is that the particles or rays have certain penetrating properties that are affected by different materials as well as by their thicknesses. This is readily understood when one becomes familiar with certain phenomena associated with these here-to-fore mysterious emission products. For instance, radioactive substances obtain this radioactivity by a disintegration process. The measure of this activity or disintegration is the Curie which is a term that has been accepted as a standard unit denoting the time scale on which radioactive transformation takes place; in other words the number of disintegrations per second. Isotope quantities, when purchased, are generally measured in terms of millicuries or thousandths of a curie.

Nuclear energies are expressed in millions of electron volts or mev. One mev is defined as being equal to the work done on one elementary electric charge by a potential difference of one volt. For example, P^{32} emits a Beta particle with energy of 1.69 mev while I^{131} emits a Beta particle of 0.6 mev and Gamma rays of 0.367 mev. It has been found that Gamma rays are diminished in number by a given absorber but are not wholly cut out while Beta particles have definite ranges and can be completely stopped by relatively small amounts of common materials; Alpha can be stopped by as little as a sheet of paper. Obviously, the Gamma rays are the emission products most difficult to stop.

Thickness of absorbing materials is generally evaluated by half-layer or tenth-layer values, i.e., the material required to reduce the radiation to one-half or one-tenth its incident value. The latter value is often used when large amounts of radioactive materials are to be used as one undoubtedly would in the example laboratory or "hot lab" as it is often called. For concrete (with limestone aggregate) the tenth layer value is 1.0 mev for six inches of concrete. A 24-inch wall would reduce the energy by 10^4 mev. This thickness of concrete wall would afford reasonable security from radioactive exposure.

For comparison, the tenth-layer value of wood is 13½-inches for 1.0 mev, which is about the same as water. Accordingly, 54-inches of wood will give the same protection as 24-inches of limestone-aggregate concrete.

One school of thought is directed toward local shielding rather than over-all shielding. This means the use of lead, brick or other suitable material immediately around the local area where the radioactive material is being used. This shielding is often portable and can be set up wherever the work is being done. It is up to the designing engineer to determine what kind of shielding is to be used.

Since the laboratory can have no windows on the "hot side", a problem of proper heating, cooling and ventilating is created. This is where the air-conditioning and heating engineer comes in. Suppose that criteria demands that three hoods shall be installed in each lab and that 900 cfm of air are required to make them function properly. The ventilating system must supply this amount plus the amount required for the occupants of the room. This air must be delivered at a certain temperature and humidity the year around in a one way system since the exhausted air might well be contaminated and dangerour for reuse.

In order that this contaminated air may not pollute the atmosphere, filters must be designed that will remove not only radioactive particles but contaminated fumes as well. Here is a problem that might well be tackled by the engineer and chemist for it is recognized that any extensive industrial use of radioactive materials would create a hazard that would far exceed our smoke and fume problems of today.

(*Continued on page 20*)

Resistance Of Floor Coverings To Grease, Oils And Selected Reagents

P. A. Sigler, BChemE '25

National Bureau of Standards

The effects of grease, oils, alkalis, acids, and bleaches on 40 floor coverings from 17 different manufacturers have been investigated by the National Bureau of Standards. Conducted at the request of the Office of the Chief of Engineers, Department of the Army, the tests were made on coverings ranging from such general types as vinyl, rubber, linoleum, asphalt, and printed enamel to several proprietary materials. The reagents to which these coverings were exposed included beef tallow, kerosene, cottonseed oil, lubricating oil, solutions of soap, sodium carbonate, trisodium phosphate, sodium hydroxide, acetic acid, sulfuric acid, and hydrogen peroxide.

As a standard testing technique for evaluating these properties was not available, a technique was devised which essentially measured the depth of a scratch caused by a "mechanical fingernail" after exposure of the material to the reagent for 24 hours. While this method has not as yet been thoroughly correlated with the scratch resistance of floor coverings in service, it has since been included in interim Federal Specifications for asphalt tile, No. SS-T-307 (GSA-FSS) of October 1, 1951.

In detail, the method involved the use of a Taber Abraser, Fig. 1, equipped with an attachment for measuring shear hardness to determine the softening effect of the reagents on the various floor coverings. The coverings were prepared for testing by cementing the surface of a 2x4 inch specimen on one end of a hollow sheet-metal cylinder, 1½ inches in diameter. Ten milliliters of test reagent were poured into the cylinders, covered to retard evaporation, and allowed to stand for 24 hours. After the reagent and cylinder were removed from the specimen, the exposed surface was blotted lightly and examined visually for defects.

The specimen was then placed on the turntable of the Taber Abraser, and a 1-inch scratch made by means of a sharp-edged tool on a pivoted beam under a load of 500 grams. The tool was curved so that the scratch width was reasonably proportional to its depth. A scratch width of over 150 mils was considered to indicate a softening effect; a scratch width of between 100 and 150 mils, a slight softening effect; and a width below 100 mils, no softening effect.

Of the various floor coverings tested, the vinyl plastics were, in general, most resistant to grease and oils. With a few exceptions, they also showed fair to good resistance to alkalies, while a number of the plastic floor coverings were adversely affected by dilute acids.

Bureau of Standards

TABER ABRASER—FIG. 1

The regular asphalt tiles showed very poor resistance to most of the oils and only fair resistance to beef tallow. Some of the so-called "grease-resistant" asphalt tiles were not outstanding as regards grease and oil resistance, and most showed poor resistance to dilute acids.

All of the linoleums were materially affected by alkaline cleaning solutions and were partially disintegrated by a 1% solution of sodium hydroxide. They provided poor resistance to acids and hydrogen peroxide, and with the exception of brown battleship linoleum, were appreciably softened by kerosene. Several were also slightly softened by beef tallow.

None of the rubber tiles withstood the effects of kerosene but all were resistant to beef tallow. Their resistance to dilute acids and alkalies varied from good to poor.

In general, the enamel-print felt-base floorings were damaged by alkaline cleaners, dilute acids, and kerosene. The mastic (bituminous) felt-backed floor coverings provided poor resistance to kerosene and were slightly softened by beef tallow. A proprietary floor covering having a resin-composition wearing surface showed fair to good resistance to the various oils and reagents with the exceptions of kerosene and dilute acids. A cork-composition flooring gave fair to good resistance for the various oils and reagents with the exception of sodium hydroxide.

(*Continued on page 18*)

Custom-Built Destruction

Al Moe, BCE '52

Have you built any wreckage lately? This question is not as absurd as it sounds. Out in Olney, Md. about fifteen miles from G. W. the Federal Civil Defense Staff College is building a $200,000 street of ruins; the type of ruins you would see if you were to enter a town that had recently been bombed or destroyed by tornado. This group of wrecked buildings is to be a work shop for disaster rescue training. Workers will enter this town after a theoretical air raid and rescue live "victims" while the sound of bombs will continue to thunder and fire will flash in the ruins.

The basements of the buildings will be realistically flooded from broken water mains. Gas mains and lines will be broken and releasing gas; harmless, of course, but necessitating the use of a gas mask. Live wires torn loose from the theoretical blasts will sputter and crackle. The voltage will be harmless, but will jolt the unwary one who is careless or mishandles equipment.

Building this full-size disaster rescue facility required careful planning. The government carefully drew up specifications, hired a well-known firm of architects to draw the plans, and selected a reliable contractor to construct the village. It must have been a surprising experience to have seen these plans for the first time, buildings awry with structural members bent and twisted, fractured masonry, and splintered wood. The buildings, however, must be built as solidly as normal buildings; everything from the ground up, including substantial defects that are structurally sound, must be built with great care.

For instance, twisted and broken beams must perform load-bearing functions. Broken floor sections must be hinged. Rubble must be sufficiently bothersome but must be safe. Incidentally, the rubble situation was carefully worked out on a percentage basis, fifty percent masonry, 30 percent broken lumber, 10 percent plaster and 10 percent miscellaneous. In fact this rubble, 1000 tons worth, will comprise the major and exterior and interior decoration.

Training in this model will include the use of block and tackle, cable, chain and rope; earth tunneling and shafting; cutting and dismantling wood panels; cutting masonry and concrete walls; handling and cutting steel beams; tunneling through wood, concrete, masonry and steel debris; raising, shoring, and bracing; and use of ladders.

The Civil Defense Administration in Washington is not content to let the Olney project be one of the few in the country. The CDA is preparing a booklet that will describe how to build your own wrecked street for around $500. Officials of CDA think the

(*Continued on page 22*)

The Old Man

Bill Baird

The "old man" came into the office just as a surveying party was starting out. "When you boys come back," he said, "I will show you a translation of that Egyptian document, written on papyrus, about 4,000 years ago. It is a report to the Pharoah of that time."

This was the translation:

"Know, O mighty Pharoah, that I have made inspection of the works of the upper Nile. I found the builders to be a most strange breed. First cometh men with a three-legged prong with which they make divers observations. Whey they approach a village the maidens fleeth and the villagers bewail exceedingly because they always aim the prong at a house, saying 'it must be moved,' although the desert stretcheth for miles around desolate. Sometimes, the prong men drive little stakes in the ground. They play a game and wait until someone knocks down one of the stakes, and then the prong men jump in the air and shout and tear their hair and call on Ra and Osiris and Isis and Set and Horos and all the lesser gods, and they become exceedingly wroth. All about a little stick. They also make many hieroglyphics, many of which they do not themselves understand.

"Then cometh the contractors. They are a class that have many possessions and ride in fine chariots, but they easily run to bitter tears, and they runneth down the work to be done, to each other, that they may make the other afraid and he add much expense to his calculations.

"Then cometh the material men clad in fine raiment and the maidens meet them with gleeful smiles, as they have something magic called an 'expense account.' They are all worshippers of the Sacred Bull. Every morning they chant 'O Sacred Bull, keep us full of thy substances because only with thee can we make our living.'

"Then cometh the letting of the contract. Whereat one contractor draws the prize, and the rest of the contractors beat their breasts and pour ashes on their heads, and say with a mighty shout, 'He can't do it for the money.' Always have they said this, and always to the end of time will they say it, even until the stars grow cold.

"But the low bidder he smiles and is pleased with himself, wise in his own conceit, and he hunteth up the three prong men and taketh them to dine with him, and handeth the check to a material man."

—Courtesy Bill Baird, Southland Company. Reprinted from Mississippi Highways, and finally stolen from Armco's "Highways".

"Inspiration is far more likely to strike a busy man than an idle-one"

NEWS AND VIEWS

—Both photos by Harry Burnett

QUEEN CAROLYN AND MARK EVANS

The merry throng that attended the 21st Annual All-U Engineers Ball at the Washington Hotel on Saturday, February 23rd saw Pi Beta Phi's beautiful Carolyn Mickelsen crowned Queen of the Engineers by Mark Evans WTOP radio and television personality. Queen Carolyn was presented with a suitably engraved gold and silver compact and a spray of American Beauty roses. She had been picked after much deliberation from the three finalists which included lovely Lee Yost, Chi Omega and the petite little beauty from Kappa Kappa Gamma, Virginia Lilienkamp. Selection was extremely difficult since the sororities submitted an exceptionally fine slate of candidates that represented the cream of George Washington's pulchritude. The others who vied for the honor of becoming the first queen in the history of the Engineering school included such eye-pleasing personalities as Ellen Wyvil, Alpha Delta Pi; Frances Suddeth, Delta Zeta; Yvonne Wentz, Zeta Tau Alpha; Doris Severe, Kappa Delta; and Becky Heon, Sigma Kappa.

CONTESTANTS AND JUDGES

The three finalists were chosen at an hour-long council meeting following a tea given for the contestants prior to the Ball. Edie Harper, the Engineer's favorite niece, acted as chaperon at the tea.

The final selection was made by three Judges, Student Council President Warren Hull, Engineers' Council Program Chairman Tom Flanagan and radio-favorite Mark Evans. Dr. Mason, the new Dean, and many faculty members were present to witness this precedent-setting event.

100th ANNIVERSARY HOSTS

• George Washington's Chapter of ASCE is playing host to all the student chapters in the Washington Area in celebrating the Society's 100th Anniversary. Student engineers from Howard, Maryland and Catholic Universities will spend the morning at George Washington attending the business meeting. The principle speaker will be General Glen E. Edgerton, Mem ASCE, Executive Director of the Commission for the Renovation of the Executive Mansion.

After a luncheon at the school cafeteria, the group will make an inspection trip of the Engineering Research and Development Laboratories at Ft. Belvoir.

The evening session will consist of a banquet at the Carlisle Hotel. Admiral "Joe" F. Jelley, Chief of the Navy's Bureau of Yards and Docks, the guest speaker, will give one of his interesting, informal talks on the importance of human relations entitled, "Engineers Need Bifocals."

OMICRON DELTA KAPPA

Three engineers were selected for membership in ODK, national honorary leadership fraternity, at the Inter-Fraternity Prom on the night of March 21st. Honored by selection are: Bob Harwood, Student Council and Sailing Club; Dick Caldwell, Theta Tau Regent and MECHELECIV Business Manager; and Al Moe, Engineers' Council and MECHELECIV Editor.

ENGINEERS' BANQUET

Saturday, May 3rd is the night that the Engineers of George Washington University get together to eat and make merry, and to receive the awards they have won during the school year. Arrangements are being made to seat 200 at this affair for which the place has not yet been chosen. The program is being carefully worked out so that the formalities can be carried out in a minimum amount of time. Advance reservations can be made by calling Miss Kriner in the Dean's Office.

ENGINEERING PERSONALITIES

R. F. TRAINER

R. F. (radio frequency) Trainer, as he prefers to be called, has spent a great part of his life going to school. He first decided to study teaching then lost his mind entirely and took up engineering.

Robert Frazer saw the light of day at Allentown, Penna. back in 1921. After graduating from South Whitehall High in 1939 he enrolled in the State Teachers College at Kutztown where he took a science major, intending to teach junior high school science after graduation.

He left State in '42 to accept a position with the Applied Physics Laboratory of the Johns Hopkins University. He worked for about a year on the then highly classified proximity fuse for shells. Someone marched a band around the block and he joined the Navy in 1943. He was sent right back to APL, however, to continue his work on the fuse. He was discharged in 1946 (from the Navy) but he liked the taking orders so well that he proposed to a local lass in Silver Spring who accepted him. Not content to leave well enough alone, he entered GWU as a full time student.

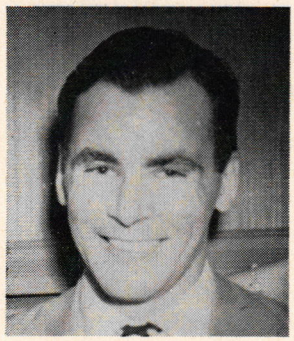
In 1949 he acquired an heir, R. F. Jr., or microwave as Bob likes to call him. Since three cannot live as cheaply as one, R. F. Sr. went back to work and continued his studies at G. W. as a night student. The following year he received his Junior Engineer's rating at APL and at the same time celebrated the arrival of his daughter Joan as well as the acquisition of a new house.

At his job he works principally with radio frequency problems. He also developed a sub-miniature FM transmitter for rocket telemetering—a picture of which was shown on the front cover of the IRE Proceedings for August 1951. He is presently a problem sponsor to New Mexico College of Agriculture and Mechanical Arts and an APL official consultant to the Industrial Research Laboratories of Baltimore.

His hobbies are: photography, amateur astronomy, radio-controlled model airplanes, electronic music and raisin' kids. He has built a six-inch reflecting telescope, a standard console electronic organ and a six-foot radio controlled airplane.

FLASH! **THE ENGINEERS' BANQUET will be held at the Hamilton Hotel — The time, 7:00 — The Date, Saturday, May 3rd. — $3.25 per plate.**

V. H. HENNESSEY



Exactly seventeen years and twenty two days before Pearl Harbor Col. H. P. Hennessy, United States Army, stationed in Honolulu, was pacing back and forth awaiting an important communique. When it was finally received, the Colonel was delighted to know that he had been promoted to fatherhood and assigned fiscal and administrative control over one Vincent H. Hennessey.

The boy grew up under the normal army routine and traveled to many parts of the world with his father and finally settled down long enough to finish high school at the Peddie School, Hightstown, N.J.

He went directly to Yale University where he was enrolled for one and a half years before the grim business of war finally caught up with him. He turned his back on Eli's big gray buildings at New Haven and entered the Army as a second lieutenant. He served as such for three and a half years during World War II and when his tour of duty was over, decided his dad could run the Army and hied himself to George Washington to enroll in a course of Civil Engineering. He received his degree, BCE "with Distinction" in 1948. During his stay at G. W. he was active in Sigma Tau, Theta Tau and the ASCE student chapter.

Corbett-Tinghir and Company of New York hired the new graduate and put him to work as a Structural Designer-Draftsman. Here he gained a great deal of experience designing power plants and later assisted in the design of the power plants at Sunbury, Pennsylvania and Kansas City, Missouri.

He became a little homesick after a year in New York and decided to return to the scene of his former labors, this time as a part-time "prof." Since part-time instructors have to eat, he also accepted a position as Civil Engineer with the Kennedy-Chamberlain Development Company of Kenwood, Maryland. He was superintendent-in-charge of construction on subdivision and street work for this company for one and a half years before transferring to a better job with the Corvey Engineering Co. of Washington.

Hennessey remained with this firm, too, for one and a half years as a Civil Engineer and was supervisor of the drafting room handling government contracts. Last December he married Jane Cooper.

(Continued on page 22)

• Eleven men were selected as being eligible for membership in Sigma Tau at the regular March meeting. Honored by selection are Bland Burns, Herbert Chandler, Louis E. Johnson, Charles Laughlin, Robert P. Little, Rudolph Ness, Donald Rodenhi, Howard Wilson, George Gould, Harold L. Boyd and Hsin Wong — an exchange student from Nationalist China.

Initiation will be held April 19th and the usual fine banquet and dance will follow.

Following the selection of candidates, the fraternity held elections of officers for the forthcoming year. Dynamic Herb Rosen was elected President, Paul Michelsen became Veep and L. E. Goodnight, Joe March, Dick Nearman, Al Parks and Harry Kriemelmeyer were elected Recording Secretary, Treasurer, Corresponding Secretary, Historian and Engineers' Council Delegate, in that order. Lynn Garrison was elected Delegate to the Council at an earlier meeting in February.

Xi Chapter is hoping to have the honor of being host to the 1952 Sigma Tau Conclave here at George Washington. The Conclave is a bi-annual affair which is attended by the presidents from all the Sigma Tau Chapters in the country.

Professor "Ben" C. Cruikshanks was unanimously elected chapter advisor for the fraternity for the coming year.

• Theta Tau had a busy time last month. Besides running down to the University of Virginia for a regional conference on the weekend of March 22nd, the fraternity held its spring initiation, banquet and dance on the 15th. Paul Couper, Turner McLauren, John Dodge, Jim Colangelo and Bob Chase were the initiates. At the banquet, the fraternity was presented with a huge birthday cake donated by the alumni.

Dr. Feiker gave a short informal speech punctuated with a joke or two stolen from his grandchildren. He was followed by Dean Mason who chose to be a man of few words that evening.

GROUP AT MARCH INITATION

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Both of Western Electric's jobs—telephone and military—are vital to this country's present and future strength. Both are filled with challenges for the best engineers of today and tomorrow.

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A UNIT OF THE BELL SYSTEM SINCE 1882

• On March 19th, the G.W. Student Chapter of ASME entertained Mr. R. J. S. Piggott, National President of the parent society at an informal dinner at Olmstead's Restaurant. After the dinner some forty members assembled in the Government Building to hear Mr. Piggott speak on "High Compression Engines". He also discussed high pressure jet lubrication of cutting tools, a method which he has developed and is having patented.

The ASME Prize Paper Competition was held after the talk and was won by Robert Baumann whose paper "Limiting Weight and Conserving Space in the Navy's Viking Rocket", was judged the best.

Mofoto

MR. PIGGOTT

• The activities of the AIEE for the month of March consisted of two outstanding events, the Student Prize Paper Contest and the Tenth Annual Student Night sponsored by the Washington Section at the Washington Section at the Naval Ordnance Laboratory.

The Washington Section of AIEE was well represented at the March 5 meeting. Mr. Fred Wilcutt, chairman, gave an informative talk on the importance of AIEE membership to the student.

Four papers were presented in the Prize Paper Contest. Murray Halperin was named winner for his paper "Induction Heating". Murray will present his paper in the District Student Prize Paper Competition at Pennsylvania State College, May 3 and 4. Prizes for winning the District Competition can amount to $100 plus several educational inspection trips. Also Radio Corporation of America has granted permission to the top three entrants in the competition to make an expense-paid tour through their research labratory at Princeton, New Jersey.

The main speaker of the evening at the Tenth Annual Student Night was Mr. T. A. Marshall, Executive Secretary, Engineering Manpower Commission who gave some very enlightening pointers on how an engineer should go about planning his future.

At the business meeting Bill Wooldridge read a letter from Professor Norman Ames, who is studying in Switzerland, acknowledging his nomination as student counselor for the George Washington AIEE Branch for the year 1952-53.

• This year sees the inauguration of two annual awards to student members of IRE. The parent society sponsors an award given to the winner of an "Information, Please" type of quiz designed to test knowledge and application of fundamental principles. The other award, sponsored by the Washington Section, will go to the candidate who has contributed most to campus activities, particularly IRE activities. Each winner will receive a year's membership in the Associate grade; the runner-up in each will receive an honorable mention certificate. These awards will be made at the Engineers' Banquet.

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It means Hope. Your boy can start a business or hope to boss the one he's in . . . In countries without free enterprise only the government owns and runs a business.

Free enterprise means Decency . . . In so-called "liberal" countries where "everything is for the people," you can be thrown into a slave labor camp to die, just on the whim of some enemy.

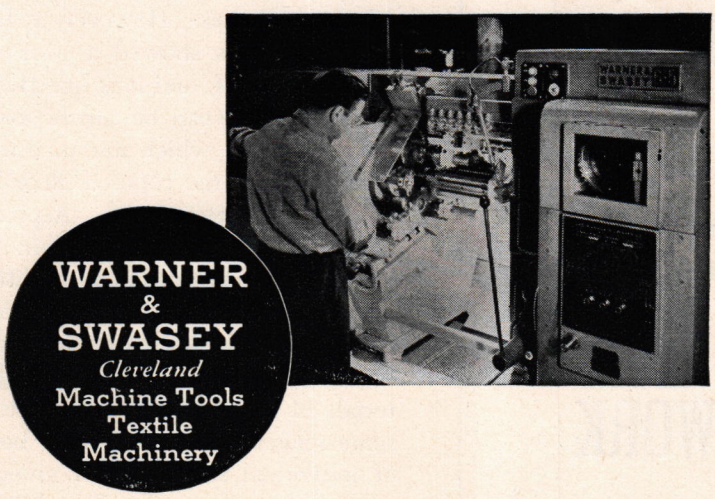
It means Home . . . not two families "assigned" to one room.

It means Courage . . . and no need to cringe at the words "police" or "party member".

It means Dignity . . . not sobbing out a "confession" in a courtroom to avoid more torture.

It means Education. Read what you want . . . not what some official decides for you. (And much of your reading may be made possible, by the way, by a Scotch immigrant boy named Carnegie who made millions under the American free enterprise system, and spent them on free libraries.)

Free enterprise — Americanism — profit-and-loss system . . . the *name* doesn't matter so long as you are on the alert against the people who are trying to change and destroy its *meaning.*



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ALUMNEWS

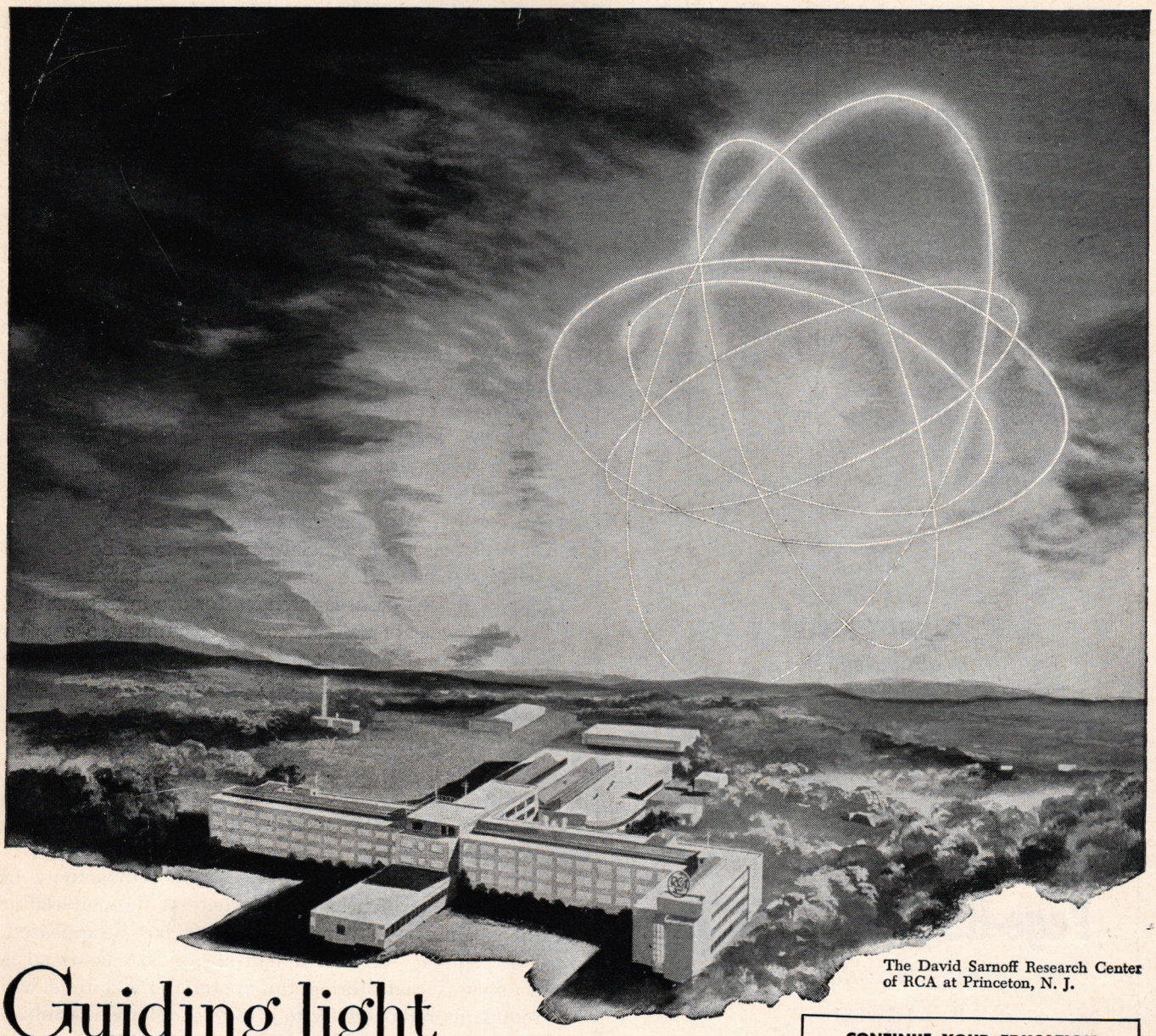
The National Bureau of Standards has been keeping us posted on what former G.W.-ites have been doing in that organization. For instance *P. A. Sigler,* BChemE '25 has been investigating such subjects as safe walkway surfaces and slipperiness of floors. He has also written a number of technical research papers on this subject. Prior to coming to NBS Sigler did food analysis for the Department of Agriculture which agency employed him after graduation. In 1928 he transferred over to National Bureau of Standards where he was assigned to the Rubber Section and subsequently to the new Specification and Testing Section. He spent his time in air conditioning research prior to getting in the flooring business except for a period during World War II when he was engaged in leather research. We decided to print his report on the Resistance of Floor Coverings to Grease, Oils and Selected Reagents.

Charles E. Brush, BSME '30, 6660 32nd St., Washington, was recently promoted to a four-striper in the Coast Guard. He is stationed here in Washington and is currently the Chief of the Development Section of the Testing and Development Division, Office of Engineering, Coast Guard Headquarters. Charlie married *Claudia Kyle,* AB '30 and now has two fine children, a daughter, 11 and a son, 9. He also thinks MECHELECIV has had some very interesting and instructive articles as well as interesting news about the students, faculty and alums. That's what we want, criticism—good or bad. Thanks Captain and congratulations on your promotion.

(*Continued from page 10*)

From an overall viewpoint, the vinyl plastics tested possessed the best properties for use in locations likely to be subjected to frequent exposure to grease, oils, and alkalies. However, at least one of the vinyl plastic samples showed a poor resistance to five of the 10 reagents, and it is questionable if vinyl plastic floor coverings can be satisfactorily installed on concrete subfloors which are in direct contact with the ground unless the concrete floor has been thoroughly membrane waterproofed. Asphalt tile, on the other hand, can be successfully laid on a concrete floor which is subject to damp conditions.

None of the reagents was highly destructive to all of the samples. At least two of the materials showed excellent resistance to each reagent. Although materials of a given type tended to be resistant to the same reagents, the differences between the resistance of individual samples of a given material was large enough to indicate the desirability of testing samples of floor coverings where severe conditions are anticipated.



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ATOMIC ERA . . . *from page 8*

What about the loads on the structure due to all the equipment necessary to furnish the air conditioning, heating and ventilation? For instance, it might take a three h.p. motor to run each hood exhaust fan or three for each room. What are the vibration problems that this might bring about? These questions merely reflect some of the problems that have to be considered; however, no attempt is being made to offer solutions.

One must carefully consider the interior finishes for the buildings. Wood or similar materials are readily contaminated by absorbing fumes or even particulate matter. In many cases it may be found economical to use wood and replace it when it reaches a certain level of contamination. Then again, it may prove more economical to use stainless steel or other materials that are not easily contaminated and which can be easily decontaminated when necessary. The answer may be in special paints that can be stripped when contaminated or covered with more paint. A new plastic paint is intended for use in this manner. When a coat of paint becomes contaminated another coat is applied over it forming a sandwich, which is then removed and properly disposed of. The solution lies in the type of structure or materials to be used and the radioactivity that will be involved.

Disposing of radioactive materials is not an easy task. Some of the elements dispose of themselves, that is, they have such a short half-life that they become relatively harmless over a period of time.

Half-life is the rate of decay of radioactivity or period over which half the activity of the material at the beginning of a period of time has disappeared. For example, As^{16} has a half-life of 26.8 hours so it is obvious that storing this material for a time will reduce its radioactivity to a state of relative harmlessness. On the other hand, there are isotopes currently in use that have much longer half-lives. I^{138} has a half-life of eight days, P^{32}—14.3 days, Co^{60}—5.3 years, C^{14}—5100 years and so on. C^{14} is very necessary in all organic compounds and is widely used in biological work. When a material has a very long half-life, disposal becomes a serious problem. Can sewage disposal plants handle this hazard or must other means be resorted to? Other factors add to this problem such as the use of radioactive isotopes of Phosphorus, Iodine and certain other elements, by hospitals, in the treatment of various ailments. Some of these hospitals are permitting the excreta of the patients so treated to enter into the sewage systems of our cities. If sufficient hospitals in an area served by one sewage disposal plant continue this practice a serious personnel hazard could be created. Current literature describes an algae that grows in rapid filter beds and that will attract radioactive elements from liquid wastes. This algae must be disposed of in turn so it appears that the solution of one prob-

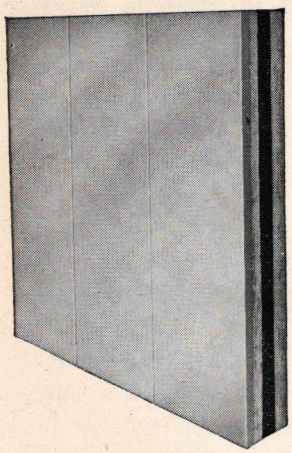
(*Continued on page 22*)

What's Happening at CRUCIBLE

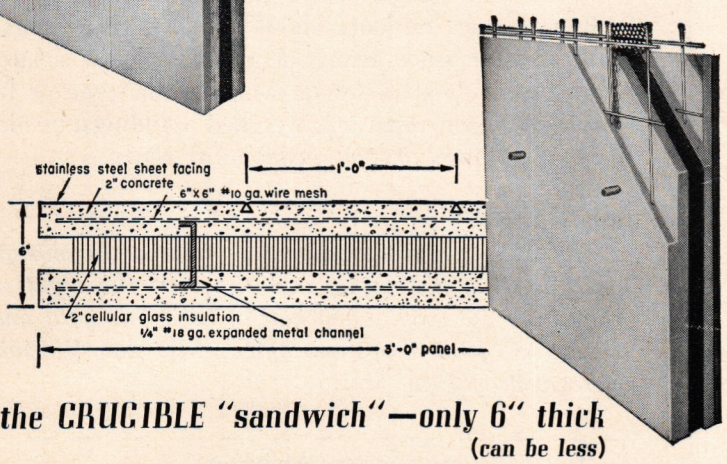
about stainless curtain walls

Modern construction methods have changed walls from the self-supporting type to a mere covering which does not support its own weight for more than one or two stories. Hence the definition of "curtain wall":—the facing or enclosure of the structural steel frame. This frame supports the entire weight of modern buildings.

The need has existed for a covering that would not only clothe the building, but be lightweight, economical and space saving. Because these requirements are more than adequately met with stainless steel curtain wall construction, this method is becoming increasingly popular with cost and space conscious owners, builders and architects.



the CRUCIBLE "sandwich"



the CRUCIBLE "sandwich"—only 6" thick (can be less)

Crucible stainless steel curtain wall panels are in the form of 6-inch thick "sandwiches". The facing consists of flanged, light-gauge stainless steel sheets with a factory, or site-fabricated, sandwich consisting of cellular glass insulation between two layers of concrete with connecting reinforcing. Crucible 18-8 stainless as the outside face offers excellent resistance to weather and fire while providing eternal beauty with a minimum of maintenance; the inside face can be finished or painted to suit the requirements of modern building interiors. Since 18-8 is restricted in use, a good substitute material, type 430 stainless, now government decontrolled, offers the same benefits as 18-8 stainless.

moisture penetration

The unique characteristics of the cellular glass insulation stop moisture vapor migration from one face of the panel to the other. The cellular insulation properly designed and installed assures that condensation will not take place *anywhere* within the sandwich.

insulation

Although less than half as thick as the usual wall construction, this Crucible stainless steel panel construction has more than twice the insulating value. The "U" value (overall thermal conductivity) is approximately 0.15 BTU Hr./Sq.Ft./°F.

fire resistance

The Crucible sandwich met the requirements of a standard 4-hour fire test conducted in the testing laboratories of the National Bureau of Standards. This meets all old building codes and is double, or better, the requirements of modern enlightened building codes.

erection and fabrication

Since a building frame is not precision built, the attachment of the panel walls to the frame is done with fastening devices that provide necessary 3-dimensional adjustment. Panels can be made at the building site, and a 24-hour casting-to-fastening cycle is possible.

technical service available

Though the use of some stainless steel is now restricted, Crucible metallurgists and development personnel are continuing to investigate improved methods of curtain wall and other construction so that better buildings can be built when stainless is more freely available. For more information write: CRUCIBLE STEEL COMPANY OF AMERICA, General Sales and Operating Offices, Oliver Building, Pittsburgh, Penna.

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ATOMIC ERA . . . *from page 20*

lem merely creates another. Effluent from air conditioning plants and water-cooled equipment from the hot labs also affect the disposal plants or the streams into which it is dumped. It is evident that long range planning is required to provide adequate disposal facilities since our present systems have insufficient capacity to handle any substantial increase in load.

Perhaps the picture has been painted unduly dark; this was done for a purpose. It was done to encourage thinking and to describe a few of the problems that one would encounter should he be involved in the design of a building or facility in which radioactive conditions are prevalent. It is an impossibility to try to cover all the problems that may arise; however, it is believed that enough has been said to indicate that the Atomic Age is a challenge to the engineer.

HENNESSEY . . . *from page 13*

Vince is presently with Thomas B. Bourne, Associates, doing the work he likes best, working on designs for municipal airports.

Besides being an active alum of his college society and fraternities he is a member of the Washington Board of Trade. He is still teaching at George Washington and is quickly becoming one of its better engineering instructors.

CUSTOM-BUILT DESTRUCTION . . . *from page 11*

cost of constructing this practice street will be paid off many times in peacetime disaster rescues.

Engineering students should follow this project with interest since many of them may, at a later date, be involved in rescue work of this type or be responsible for repairing wrecked buildings or demolishing those beyond economical repair.

MISFORTUNE

The MECHELECIV sincerely regrets the misfortune that befell Murphy and Ames on the night of December 28, 1952, when half of their fine yard and almost all of the shops and office in Rosslyn, Virginia were destroyed by fire.

To: The MECHELECIV Magazine
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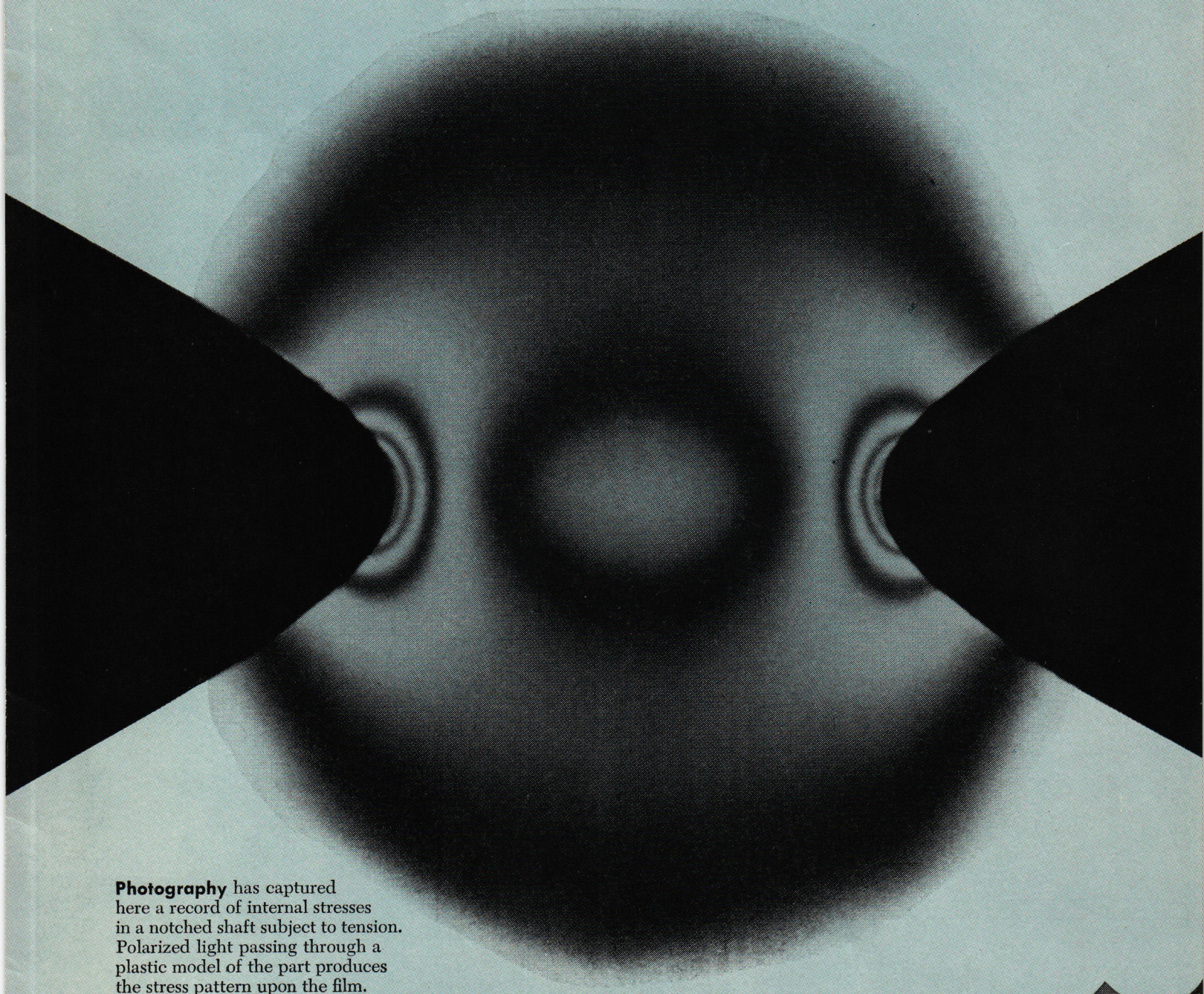
Photography gives engineers quick, accurate facts

● In routine work—in unique applications—engineers find photography can supply information obtainable in no other way. It can show you internal stresses in machine parts—you see what modifications in design will increase strength and reduce weight. You can study fast motion by slowing it down with high speed movies. You can record the flick of the cathode-ray trace or get accurate records of other instrument readings.

Photography is already aiding engineering in many important ways, and new applications are being made every day. This has led graduates in the physical sciences and in engineering to find positions with the Eastman Kodak Company. If you are interested, write to the Business and Technical Personnel Department, Eastman Kodak Company, Rochester 4, N. Y.



Photography has captured here a record of internal stresses in a notched shaft subject to tension. Polarized light passing through a plastic model of the part produces the stress pattern upon the film.

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WE ASKED GRADUATES TEN YEARS OUT OF C

WHAT MADE YOU DECIDE ON A CAREER WITH GENERAL ELEC

This advertisement was written by G-E employees who graduated ten years ago—long enough to have gained perspective, but not too long to have forgotten the details of their coming with the Company. These graduates were sent a questionnaire and were requested to return it unsigned. Their answers, listed below in order of mentions, give an informative appraisal of G.E. as a place to work and as a source of career opportunities.

1. G-E TRAINING PROGRAMS

Sample quotes: "I knew that G.E. offered the best training courses." "Liked the idea of rotating assignments and courses." "Wanted to take advantage of the training courses." "G.E. had a training plan which would let me choose a job after reasonable time for investigating jobs available in the Company." "I felt that Test (Test Engineering Program) would make the easiest transition from school to work." "I felt that I would get the best kind of electrical engineering training if I went with G.E." "The Test course appealed to me because of its combination of continued technical instruction plus practical experience on the test floor."

2. VARIETY OF OPPORTUNITIES

"Why does a youngster run away with a circus?" "Believed it was a good chance to find the field I liked best as I wasn't quite *sure* what type of work I wanted to get into." "G.E. goes out of its way to find the corner you are happiest in and best suited for." "The varied opportunities of work let you change jobs without leaving the company." "Only company which offered a job where an engineer could be in on design, sales and application—i.e., 'application engineering.'" "Promise of varied experience made it unnecessary to decide on a particular specialty until I had more opportunity to look the field over."

3. GENERAL ELECTRIC'S REPUTATION

"G.E.'s prestige and reputation appealed to me." "G.E. was more favorably disposed to the coming war effort and was doing work directly contributory." "High caliber persons with whom to work." "Reputation for technical excellence." "G.E.'s reputation as a good employer." "Because with the name of G.E. went a sense of security." "I felt that G.E. was the leader in the electrical field and I wanted to take part."

4. CONSIDERATE TREATMENT

"The only offer I received was from General Electric—other companies interviewed would not consider me because of my reserve officer status." "Among the companies offering jobs to college graduates in 1941, G.E. seemed to take more of a personal interest in its new men." "The G-E representatives made me feel they were interested in *me*."

For a free booklet, "Planning Your Career," a description of such G-E training programs as the Test Engineering Program, Business Training Course, Manufacturing Training Program, Chemical and Metallurgical Program, the Physics Program and Sales Training programs, write to General Electric Co., Dept. 221B-6, Schenectady, N. Y.

You can put your confidence in—

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